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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/591,946	11/30/2006	Stephan Oberle	27634U	6433

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EXAMINER	
YABUT, DANIEL D	
ART UNIT	PAPER NUMBER
3656	
MAIL DATE	DELIVERY MODE
08/18/2010	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/591,946	OBERLE ET AL.	
	Examiner	Art Unit	
	DANIEL YABUT	3656	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *07 June 2010*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-19* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-19* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

1. **Claims 1-5, 9, 12-14, 16, 17 and 19** are rejected under 35 U.S.C. 103(a) as being unpatentable over Korean PG Pub KR20020046534 in view of Berlinger, Jr. et al., US Patent, 6,101,892.

KR20020046534 discloses an engine auxiliary drive (see Fig. 1) comprising a(n):

Re claim 1

- First (5) toothed gear wheel made of plastic (English abstract / L6-9)
- Second gear wheel (4) with tooth flanks (at 5 and 4, respectively) meshing with each other (abstract / L7-9)

However, as to **claim 1**, KR20020046534 does **not** expressly disclose the tooth flanks of said toothed gear wheels comprising an involute-free mesh profile in the force transmission area, and transition from a concave area directly to a convex area, effective profiles of said tooth flanks matching in a manner that the meshing of the tooth flanks occurs at planiform contact regions, linearly viewed in cross section, along their complete height, and the effective profiles of the tooth flanks coordinated with each other over their entire height, thereby establishing said planiform contact regions, linearly viewed in cross section, along their complete height.

Berlinger Jr. et al. teaches the use of tooth flanks (Fig. 2) of tooth gear wheels (20, 22) comprising an involute-free mesh profile in the force transmission area (C4 / L60-65), and transition from a concave area directly to a convex area (C4 / L56-58, C5 / L7-14), effective profiles of said tooth flanks matching in a manner that the meshing of the tooth flanks occurs at planiform contact regions (C4 / L60-65; see planiform contact regions at A and B in Fig. Y below), linearly viewed in cross section, along their complete height (Fig. 2), the effective profiles of the tooth flanks coordinated with each other over their entire height (C4 / L60-65), thereby establishing said planiform contact regions (A and B; Fig. Y below), linearly viewed in cross section, along their complete height (Fig. 2) for the purpose of reducing contact stress that can reduce the rate of wear of the gears (C4 / L61-65, C5 / L59-64) and thus enhances the performance of the auxiliary drive.

Regarding **claim 1**, it would have been obvious to one having ordinary skill in the art at the time of the invention to provide the tooth flanks of said toothed gear wheels comprising an involute-free mesh profile in the force transmission area, and transition from a concave area directly to a convex area, effective profiles of said tooth flanks matching in a manner that the meshing of the tooth flanks occurs at planiform contact regions, linearly viewed in cross section, along their complete height, and the effective profiles of the tooth flanks coordinated with each other over their entire height, thereby establishing said planiform contact regions, linearly viewed in cross section, along their complete height, as taught by Berlinger Jr. et al., in the device of KR20020046534 for the purpose of reducing contact stress that can reduce the rate of wear of the gears and thus enhances the performance of the auxiliary drive

KR20020046534 as modified above further comprises the following:

Re claims 2 and 5

- Second gear wheel (5) is made of a material with greater strength than the first gear wheel (4), the second gear wheel (5) being metal (abstract / L6-9).

Re claim 3

- At least sections opposing tooth flanks of gear wheels (10, 12; Berlinger) having nearly the same curvature in their tooth flanks (Fig. 1; C2 / L38-39; Berlinger)

Re claim 4

- Concave area (10b; Fig. 1; Berlinger) being situated in an area adjoining a tooth base (near 10b; Berlinger)
- Convex area (10c; Berlinger) being situated in an area of the respective teeth adjoining a tooth crest (near 10c; Berlinger).

Re claim 9

- During the during rolling off of the gear wheels (20, 22) there are always two or more teeth (see at least two teeth being meshed in Fig. 2) of the gear wheels meshed with each other (C4 / L58-60; C5 / L59-64).

Re claim 12

- Engine auxiliary drive driving one or more balancing shafts (see lines 1-3 of abstract)

Re claim 13

- First and second gear wheels are designed as helical-toothed spur gears (see helical teeth at 5 and 4, respectively)

However, as to **claim 14**, KR20020046534 **does not** expressly disclose the first and second gear wheels are designed as straight-toothed spur gears.

Berlinger, Jr. et al. teaches the use of the first and second gear wheels (12, 10) being designed as straight-toothed spur gears (see Fig. 3A) for the purpose of avoiding the resultant thrust along the axis of the gear and that helical gears can produce as well as being easier to manufacture than helical gears.

Regarding **claim 14**, it would have been obvious to one having ordinary skill in the art at the time of the invention to alternatively provide the first and second gear wheels being designed as straight-toothed spur gears, as taught by Berlinger, in the device of KR20020046534 as modified above for the purpose of avoiding the resultant thrust along the axis of the gear and that helical gears can produce as well as being easier to manufacture than helical gears.

KR20020046534 as modified above further discloses the following:

Re claim 16

- First (5) toothed gear wheel made of plastic (English abstract / L6-9).
- Second gear wheel (4) with tooth flanks (at 5 and 4, respectively) meshing with each other (abstract / L7-9).
- Tooth flanks of said toothed gear wheels having an involute-free mesh profile in the force transmission area (C4 / L60-65; Berlinger Jr et al.).
- Transition from a concave area directly to a convex area (C4 / L56-58, C5 / L7-14; Berlinger Jr. et al.)
- Effective profiles of said tooth flanks matching in a manner that it comes to planiform contact regions (C4 / L60-65; see planiform contact regions at A and B in Fig. Y below Berlinger Jr. et al.), linearly vied in cross section, along their complete height (Fig. 2).

- Effective profiles of the tooth flanks coordinated with each other over their entire height, thereby establishing said planiform contact regions, linearly viewed in cross section, along their complete height.
- Transition from the concave area directly to the convex area provides a direct change from a concave to a convex curve in transition zones with no involute transition area (C4 / L56-58, C5 / L7-14; Berlinger Jr. et al.), thereby reducing development of noise during meshing (C1 / L29-40, C5 / L59-64), and achieving a high bearing and loading capablilty over an entire rolling contact zone resulting from the meshing of teeth (C5 / L59-64).

Re claim 17

- Second gear wheel (5) is made of a material with greater strength than the first gear wheel (4), the second gear wheel (5) being metal (abstract / L6-9).

Re claim 19

- During the during rolling off of the gear wheels (20, 22) there are always two or more teeth (see at least two teeth being meshed in Fig. 2) of the gear wheels meshed with each other (C4 / L58-60; C5 / L59-64).

2. **Claims 6-8 and 18** are rejected under 35 U.S.C. 103(a) as being unpatentable over Korean PG Pub KR20020046534 and Berlinger, Jr. et al., US Patent, 6,101,892 as applied to claims 1-5 and 12-13 above, and further in view of Pickles, US Patent 2,760,381.

As to **claims 6-8**, KR20020046534 discloses all the claim limitations, see above, but does **not** expressly disclose the tooth thickness of the teeth of the gear wheel made of metal being less than the thickness of the teeth of the plastic gear wheel , the gear wheel made of

plastic having a greater tooth width or tooth thickness on the pitch circle of the gear wheel than the space width between adjacent teeth, and the gear wheel made of metal having a smaller tooth width or tooth thickness on the pitch circle of the gear wheel than the space width between adjacent teeth.

Pickles teaches the use of a tooth thickness (T2) of the teeth (14) of a gear wheel (11) made of metal (C2 / L51-53) being less than the thickness (T1) of the teeth of the plastic gear wheel (12) (C2 / L59-65), where the wheel made of plastic (12) has a greater tooth thickness on the pitch circle of the gear wheel than the space width between adjacent teeth and the wheel made of metal (11) has a smaller tooth thickness on the pitch circle of the gear wheel than the space width between adjacent teeth (C2 / L30-36) for the purpose of increasing the strength of the plastic gear while not adding unnecessary material to the metal gear wheel (C1 / L60-65) thus providing a mechanism with lighter weight.

Regarding **claims 6-8**, it would have been obvious to one having ordinary skill at the time of the invention to provide a tooth thickness of the teeth of a gear wheel made of metal being less than the thickness of the teeth of the plastic gear wheel, where the wheel made of plastic has a greater tooth thickness on the pitch circle of the gear wheel than the space width and the wheel made of metal has a smaller tooth thickness on the pitch circle of the gear wheel than the space width, as taught by Pickles, in the device of KR20020046534 as modified above for the purpose of increasing the strength of the plastic gear while not adding unnecessary material to the metal gear wheel thus providing a lighter mechanism with lighter weight.

KR20020046534 as modified above further discloses the following:

Re claim 18

- Second gear wheel is made of metal (abstract / L6-9)
- Tooth thickness of the teeth of the gear wheel made of metal is less than a thickness of the teeth of the gear wheel made of plastic (C2 / L59-65; Pickles)
- Gear wheel made of plastic has a greater tooth width or tooth thickness on the pitch circle of the gear wheel than a space width between adjacent teeth (C2 / L30-36).

3. **Claims 10, 11 and 15** are rejected under 35 U.S.C. 103(a) as being unpatentable over Korean PGPub KR20020046534 and Berlinger, Jr. et al., US Patent, 6,101,892 as applied to claims 1-5 and 12-13 above, and further in view of Hiroi et al., PG Pub 2002/0051860.

As to claim 10, KR20020046534 discloses all the claim limitations, see above, but does **not** expressly disclose the plastic gear wheel being an injection molded part that receives no additional treatment after the injection molding.

Hiroi et al. teaches the use of a plastic gear wheel (11; Fig. 3) being an injection molded part (para. [0030] / L4-6) that receives no additional treatment after the injection molding (para. [0015] / L1-5) to thereby reduce manufacturing costs that would otherwise be expensed by further treatments.

Regarding claim 10, it would have been obvious to one having ordinary skill at the time of the invention to alternatively provide a plastic gear wheel being an injection molded part that receives no additional treatment after the injection molding, as taught by Hiroi et al., in the device of KR20020046534 as modified above to thereby reduce manufacturing costs that would otherwise be expensed by further treatments.

KR20020046534 as modified above further discloses the following:

Re claim 11

- The gear wheel made of plastic is injection molded onto a hub or a part of a shaft having raised parts (15; Hiroi et al.) and/or depressions on its outer circumference.

Re claim 15

- The plastic for the first gear wheel is a homogeneous plastic (paragraph [0011] lines1-3)

Note: *Regarding claims 10 and 11, the MPEP states, "[E]ven though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process." In re Thorpe, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985). See MPEP 2113.*

Response to Arguments

Applicant's arguments filed 6/7/2009 have been fully considered but they are not persuasive.

In response to Applicant's argument that Berlinger describes that "there is no contact made along the transition zones 20a and 22a" and thus teaches away from an involute-free mesh profile, paragraph 2 on page 2 of Applicant's specification recites, "On gear wheels without looking outside gearing, the effective profiles of involute toothing, looking outward from inside the tooth, **is always convex**. Typical of gear wheels of involute design is the fact that when the gear roll off of each other, when viewed in cross section the **contact between them is in the**

form of a dot. Viewed in three-dimensional space, **the gear wheels roll off of each other in a linear pattern, with the line of contact being parallel to the axes of the gear wheels**" (emphasis added). Berlinger does **not** disclose an involute profile but in fact discloses a mesh profile that is in direct opposition to what Applicant admits to be an involute profile in the aforementioned passage. For example, Berlinger discloses a tooth gear wheel that incorporates both a convex and concave portion. As such, Applicant's argument regarding this issue is unpersuasive.

In response to Applicant's general argument that Chun (KR20020046534) fails to disclose or suggest how to construct the gear from synthetic plastic material, the MPEP states, "[E]ven though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process." In re Thorpe, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985). See MPEP 2113.

In response to Applicant's general argument that Chun as modified above does not suggest or disclose that the gear noise be controlled by the transition from the concave area provided with profiles of said tooth flanks matching in a manner that the meshing of the tooth flanks occurs at planiform contact regions, the MPEP recites, "the examiner notes while features of an apparatus may be recited either structurally or functionally, claims directed to >an< apparatus must be distinguished from the prior art in terms of structure rather than function. The reference discloses all the claimed structural limitations and therefore anticipates the claim. See

MPEP 2114. Additionally, the teaching reference, Berlinger Jr. et al., expresses that gear assemblies that have a "variable angular velocity ratio" are "generally noisy" (C1 / L29-35) as compared to one with a constant angular velocity ratio, however, it is further expressed in Berlinger Jr. that the design of Chun as modified by Berlinger Jr. et al. may provide a constant ratio of the angular velocity (C4 / L66-67; C5 / L1-3). Therefore, one of ordinary skill in the art would recognize that the device of Chun as modified above inherently reduces gear noise by the transition from the concave area provided with profiles of said tooth flanks matching in a manner that the meshing of the tooth flanks occurs at planiform contact regions, as described above.

In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.,* 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

APPENDIX

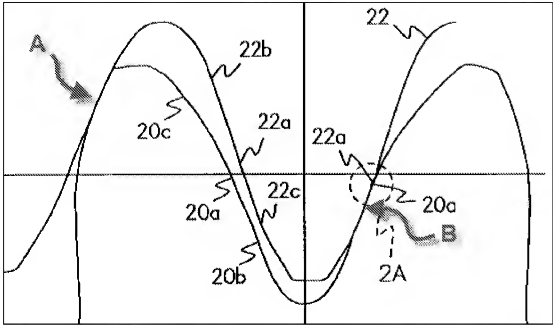

Figure Y: View of tooth flanks of Berlinger Jr. et al.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DANIEL YABUT whose telephone number is (571)270-5526. The examiner can normally be reached on Monday through Friday from 9:00 A.M. to 5:00 P.M. EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richard W. Ridley can be reached on (571)272-6917. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR

system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/DANIEL YABUT/
Examiner, Art Unit 3656
8/11/2010

/Richard WL Ridley/
Supervisory Patent Examiner, Art Unit 3656